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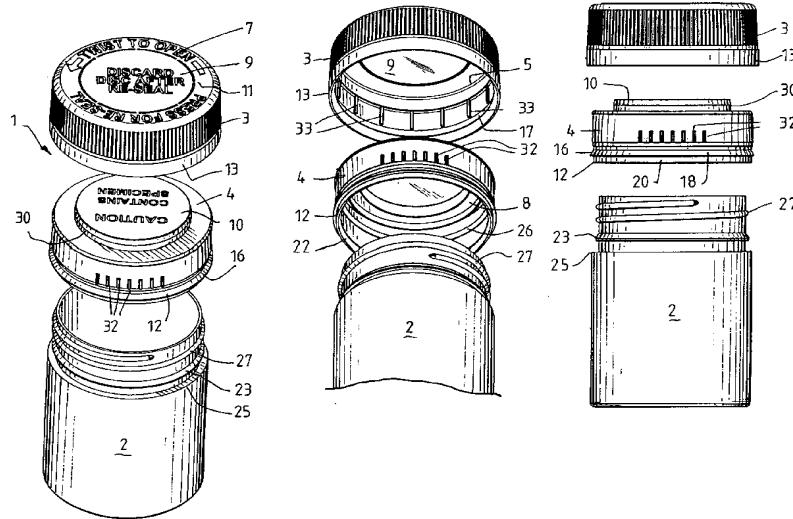
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: A TAMPER EVIDENT CLOSURE



(57) Abstract: A tamper evident closure for a containers, such as specimen containers, is disclosed. The closure includes an inner cap (4) having a first tamper evident band (12) joined to the inner cap by a frangible portion (14) for tamper evidencing engagement with the container. The closure also includes an overcap (3) having a second tamper evident band (13) joined to the overcap by a frangible portion (15) for tamper evidencing engagement with the container. The overcap is engageable with the inner cap and is selectively movable from a first position in which the second tamper evident band is not engaged with the container to a second position in which the second tamper evident band engages the container.

- 1 -

A TAMPER EVIDENT CLOSURE

Field of the Invention

5 This invention relates to a tamper evident closure for containers. In particular, the invention relates to a tamper evident closure for specimen containers.

10 Background to the Invention

Tamper evident closures are used to indicate that a container has been opened. High levels of tamper evidence are often required for medicinal or therapeutic goods as well as providing uncontaminated specimens for medical testing.

Particularly in the case of providing uncontaminated specimens, it is necessary to show that the specimen container is initially sterile and that any sample provided in the specimen container has not been interfered with after closure of the container. The present invention is intended to provide a closure for a container that will meet these requirements.

25

The discussion of the prior art above does not form part of the common general knowledge as it exists in Australia and is not an admission to that effect.

30 Summary of the Invention

According to one aspect of the invention there is provided a tamper evident closure for a container comprising:

35 an inner cap having a first tamper evident band joined to the innercap by a frangible portion for tamper evidencing engagement with the container;

- 2 -

an overcap having a second tamper evident band joined to the over cap by a frangible portion for tamper evidencing engagement with the container;

5

the overcap being engageable with the inner cap, and selectively movable from a first position in which the second tamper evident band is not engaged to a second position, in which the second tamper evident band engages.

10

The second tamper evident band may engage the container via the first tamper evident band. Preferably, the second tamper evident band engages the first tamper evident band while the first tamper evident band engages the container.

15

A frangible member may be provided between the inner cap and the overcap for controlling movement of the overcap from the first position to the second position.

20

The frangible member can be used to provide a visual indication of the movement of the overcap to the second position and thus engagement of the second tamper evident band. The frangible member may be part of either the overcap or inner cap. The frangible member is preferably on the overcap.

25

Preferably, the frangible member is a removable portion that is joined to the overcap by a frangible portion. The removable portion may be displaced by a raised top portion in the inner cap. In this arrangement, the raised top portion pushes against the removable portion to separate the removable portion at its frangible portion from the overcap as the overcap moves to the second position.

30

35
The tamper evident closure of this invention can be used to provide tamper evidence as sequential stages of

- 3 -

use of the container. Once the closure is fitted to a container and the first tamper evident band of the inner cap is engaged with the container, removal of the closure will be evident. Thus if the container is sterile when
5 the closure is initially fitted, the breaking of the first tamper evident band indicates that the container is no longer sterile. When the closure is refitted the second tamper evident band is engaged by moving the overcap to the second position. Consequently tamper evidence is
10 provided to indicate whether the container has been reopened. In the preferred embodiment the movement of the overcap from the first to the second position results in the breaking of the frangible member that provides a visual indication that the overcap has been engaged.
15 Consequently the closure is particularly suitable for the requirements of safe and accurate testing of medical specimens. The first tamper evident band provides an indication of whether the container is sterile and suitable for the receipt of a sample. Once the sample is
20 placed in the container and the overcap moved to the second position the second tamper evident band provides indication of whether the container has been opened since the introduction of the sample.

25 The raised top portion may have a step portion for restraining movement of the overcap relative to the inner cap so that the overcap and inner cap move as a unit. The diameter of the step portion is preferably larger than the diameter of the aperture formed by
30 separation of the removable portion from the overcap. Preferably, the diameter of the raised top portion other than the step portion is less than the diameter of the aperture. In a preferred embodiment, the step portion allows the overcap to be positively retained by the top
35 raised portion.

The frangible portions joining the inner cap and

- 4 -

the overcap with their respective tamper evident bands may have differing strengths. Preferably, the frangible portion joining the overcap and the second tamper evident band is stronger than the frangible portion joining the 5 inner cap and the first tamper evident band. This ensures that when excessive force is applied to the closure, the first tamper evident band breaks from the inner cap before the second tamper evident band breaks from the overcap.

10 The differing strengths of the frangible portions of the inner cap and overcap may be determined by varying the structure of the frangible portions of the overcap and inner cap. For example, where the frangible portions are in the form of weakened bridges, the frangible portion of 15 the overcap may comprise a larger number of bridges than the frangible portion of the inner cap. Alternatively, the bridges of the frangible portion of the overcap may have a greater thickness than the bridges of the frangible portion of the inner cap. It is preferred that the overcap has more bridges than the inner cap. In a 20 preferred embodiment, the frangible portion of the inner cap is about 20% weaker in resisting torque than the frangible portion of the overcap.

25 The first tamper evident band may have a lug portion for engaging the second tamper evident band. Preferably, the first tamper evident band has an outwardly extending lug portion. The outwardly extending lug portion may have a ramp surface for engaging the second 30 tamper evident band. The ramp surface may end in a tooth. In a preferred embodiment, the outwardly extending lug portion is annular.

35 The first tamper evident band may have a lug portion for engaging the container. Preferably, the first tamper evident band has an inwardly extending lug portion. The inwardly extending lug portion may have a ramp

- 5 -

surface. The ramp surface may end in a tooth. The inwardly extending lug portion may be annular. In a preferred embodiment, the inwardly extending lug portion engages an annular rim or tamper evident band retaining 5 ring on the container.

The second tamper evident band may have a lug portion for engaging the first tamper evident band. Preferably, the second tamper evident band may have an 10 inwardly extending lug portion. The inwardly extending lug portion may have a ramp surface for engaging the first tamper evident band. The ramp surface may end in a tooth. In a preferred embodiment, the inwardly extending lug portion is annular.

15 Furthermore, in a preferred embodiment, the inwardly extending lug portion of the second tamper evident band engages the outwardly extending portion of the first tamper evident band along their respective ramp 20 surfaces and teeth so as to place the second and first tamper evident bands into engagement with each other.

25 The overcap may have an engaging portion for engaging the inner cap. Preferably, the overcap has an inward land portion. The inward land portion may be spaced from the top of the overcap. In a preferred embodiment, the inward land portion is annular.

30 The inner cap may have an engaging portion to engage the overcap. The inner cap preferably has an outwardly extending clip portion. The outwardly extending clip portion may be located near the top edge of the inner cap. In a preferred embodiment, the outwardly extending clip portion is annular.

35 Furthermore, the inward land portion preferably cams against the outwardly extending clip portion when the

- 6 -

closure is removed from the container.

5 The inner cap may have a series of vertical ribs for engaging the overcap. The overcap may have a series of vertical ribs for engaging the inner cap. In a preferred embodiment, the vertical ribs of the inner cap and the overcap engage so that the overcap and inner cap rotate together to remove the closure from the container.

10 The removable portion may be formed by a line of weakness cut into the overcap. Alternatively a weakened bridge may extend between the top removable portion and the overcap. Preferably, a series of weakened bridges extend between the circumferential edges of the top removable portion and the overcap.

15 The inner cap may have a sealing portion for engaging the lip of the container. Preferably, the sealing portion extends downwardly from the inner cap. In a preferred embodiment, the sealing portion is a wedge shaped seal.

Brief Description of the Drawings

25 To assist in the understanding of the invention, a preferred embodiment of the invention will now be described with reference to the drawings.

30 Figure 1A is an exploded perspective view of the tamper evident closure according to the invention with a container.

35 Figure 1B is an exploded perspective view from below of the tamper evident closure of Figure 1A.

Figure 1C is an exploded side view of the tamper evident closure of Figure 1A.

- 7 -

Figure 2A is a side view of the tamper evident closure of Figure 1 engaged with the container.

5 Figure 2B is a cross sectional view of the tamper evident closure of Figure 1.

Figure 2C is a top view of the overcap of the tamper evident closure of Figure 1.

10 Figure 3A is a side view of the tamper evident closure of Figure 1 when removed from the container for the first time.

15 Figure 3B is a cross sectional view of the tamper evident closure of Figure 3A.

20 Figure 4A is a side view of the tamper evident closure of Figure 2 when the replaced onto the container for the second time.

Figure 4B is a cross sectional view of the tamper evident closure of Figure 4A.

25 Figure 4C is a top view of the overcap of the tamper evident closure of Figure 4A.

30 Figure 5A is a side view of the tamper evident closure of Figure 3 when removed for the second time from the container.

Figure 5B is a cross sectional view of the tamper evident closure of Figure 5A.

35 Figure 5C is a top view of the overcap of the tamper evident closure of Figure 5A.

- 8 -

Referring to Figures 1A, 1B and 1C, there is provided a tamper evident closure 1 according to the invention. The closure 1 comprises two separate caps, an overcap 3 and an inner cap 4. The closure 1 fits over 5 container 2 for use as a specimen container. Referring to Figures 1B and 1C in particular, the inner cap 4 has a series of vertical ribs 32 for engaging the overcap 3. The overcap 3 has a corresponding series of vertical ribs 33 for engaging the inner cap 4. The vertical ribs 32 and 33 10 of the inner cap 4 and the overcap 3 engage so that the overcap 3 and inner cap 4 rotate together to remove the closure 1 from the container.

Referring to Figures 2A and 2B, the overcap 3 has 15 an inward annular land portion 5 for engaging the inner cap 4 located near the top 7 of the overcap 3. The overcap top 7 has a removable disc 9 which is connected to top 7 by a series of frangible bridges 11. The removable disc 9 is shown in Figure 2C. Both the overcap top 7 and 20 the disc 9 may have written instructions moulded into their respective exterior surfaces to instruct a user.

The overcap 3 has a second tamper evident band 13 extending from its lower end opposite to top 7 and joined 25 to the overcap 3 by a series of frangible bridges 15 located along the circumference of the second tamper evident band 13. Second tamper evident band 13 has an inwardly extending lug portion 17 comprising a ramp surface 19 ending in a tooth 21.

30

The inner cap 4 has an outwardly extending annular clip portion 6 at its top edge for engaging the inward land portion 5 of the overcap 3. The inner cap 4 has a wedge seal 8 for engaging the lip of container 2.

35

The inner cap 4 has a raised top portion 10, which may also have written instructions or a written

- 9 -

warning (as illustrated in Figure 4C) moulded into its exterior surface. The top raised portion 10 is roughly cylindrical in shape to correspond to the circular profile of disc 9 in the overcap 3. The raised top portion 10 has a step portion 30 which has a diameter larger than the diameter of the aperture formed when the disc 9 is removed from top 7 of the overcap 3. In contrast, the top raised portion 10 has a diameter that is slightly smaller than the aperture formed by removal of disc 9. The step portion 30 restrains movement of the overcap 3 upwards along the inner cap 4, allowing the overcap 3 to be positively retained by top raised portion 10 so that the overcap 3 and inner cap 4 move as a single unit.

The inner cap 4 has a first tamper evident band 12 extending from its lower end opposite to raised top portion 10 and joined to the inner cap 4 by a series of frangible bridges 14 located along the circumference of the first tamper evident band 12. First tamper evident band 12 has an outwardly extending lug portion 16 and an inwardly extending lug portion 22. The outwardly extending lug portion 16 has ramp surface 18 ending in a tooth 20. Similarly, inwardly extending lug portion 22 has ramp surface 24 ending in a tooth 26.

The number of frangible bridges 15 between the overcap 3 and its tamper evident band 13 is greater than the number of frangible bridges 14 between the inner cap 4 and its tamper evident band 12. Consequently, the connection between the overcap 3 and tamper evident band 13 is stronger than the connection between the inner cap 4 and the tamper evident band 12. This means that should a user apply excessive force to the closure 1 in operation, the tamper evident band 12 will break from the inner cap 4 before the tamper evident band 13 breaks from the overcap 3. The bridges 15 of the overcap 3 are designed to break under an applied torque of about 10 inch pounds whereas

- 10 -

the bridges 14 are designed to break under an applied torque of about 8 inch pounds.

When the overcap 3 is fitted onto inner cap 4,
5 the land portion 5 of the overcap 3 lies adjacent to the clip portion 6 of the inner cap 4. The inwardly extending lug portion 17 of the second tamper evident band 13 is initially adjacent to the outwardly extending lug portion 16 of the first tamper evident band 12 via their
10 respective ramp surfaces 19 and 18. In addition, downwardly extending wedge seal 8 of the inner cap 4 engages the lip of the container 2 to form a tight seal to keep the inside of the container 2 sterile.

15 In operation, the tamper evident closure 1 is assembled by fitting overcap 3 onto inner cap 4. The closure 1 is then fitted onto the container 2 by internal screw thread 26 on the inner cap 4 engaging corresponding external screw thread 23 on the container 2, as shown in
20 Figure 2B. At this stage, the inwardly extending lug portion 22 of the first tamper evident band 12 lies below annular rim 23 on the container 2.

When a user is to provide a sample to be placed
25 inside the container 2, the closure 1 is unscrewed, causing land portion 5 to abut and cam against clip portion 6. This pulls the first tamper evident band 12 upward and the inwardly extending lug portion 22 engages the annular rim 23 of the container 2. Consequently, the
30 frangible bridges 14 between the first tamper evident band 12 and the inner cap 4 break. Thus, the closure 1 is removed from the container 2 with the first tamper evident band 12 left resting on land portion 25 of the container 2, as shown in Figure 3B. The first tamper evident band 12 indicates that the wedge seal 8 on the closure 1 and
35 the container 2 has been removed and so the container 2 is no longer sterile.

- 11 -

Once the sample is provided and placed within container 2, the user then screws the closure 1 back onto the container 2. As shown in Figures 4B and 4C, this
5 forces the overcap top 7 onto the raised top portion 10, causing frangible bridges 11 to break and dislodging removable disc 9 from the closure 1. Although the step portion 30 has a larger diameter than the diameter of the aperture formed by removal of disc 9, the edges of the
10 overcap 3 which define the aperture flex, allowing the step portion 30 to extend through the aperture. After step portion 30 passes through the aperture, the edges flex back and the raised top portion 10 extends through the aperture so that the exterior surface of the raised
15 top portion 10 is revealed. Consequently, as the diameter of the raised top portion 10 (other than step portion 30) is less than the diameter of the aperture, the overcap 3 (and second tamper evident band 13) moves further downward along the container neck than its initial position shown
20 at Figure 2B. In addition, the step portion 30 restrains movement of the overcap 3 upwards along the inner cap 4, ensuring that the overcap 8 is positively retained by top raised portion 10. Accordingly, the overcap 3 and inner cap 4 move as a single unit.

25

As the overcap 3 and inner cap 4 are made from different coloured plastic, this notifies that a sample has been placed within the container 2. As shown in Figure 4C, a suitable written or graphic warning on the
30 exterior surface of raised portion 10 of the inner cap 4 also indicates that a sample is held within the container 2. In addition, as the second tamper evident band 13 has not been broken this indicates that the container 2 has not been tampered or interfered with after provision of
35 the sample.

Again referring to Figure 4B, replacing the

- 12 -

closure 1 onto the container 2 also results in the inwardly extending lug portion 17 of the overcap 3 engaging the outwardly extending lug portion 16 of the first tamper evident band 12 along their respective ramp surfaces 19 and 18. As the overcap 3 extends further than its initial position, the inwardly extending lug portion 17 cams over the outwardly extending lug portion 16 until the tooth 21 of the inwardly extending lug portion 17 engages the tooth 20 of the outwardly extending lug portion 16. This secures the second tamper evident band 13 adjacent to the first tamper evident band 12.

When the sample is to be accessed for testing, the closure 1 is again unscrewed from container 2. This action moves the second tamper evident band 13 upward and the inwardly extending lug portion 13 engages the outwardly extending lug portion 16 at their respective teeth 21 and 20. As the flat surfaces of the teeth 21 and 20 prevent further relative movement between the lug portions 13 and 16, the upward force breaks the frangible bridges 15 between the second tamper evident band 13 and the overcap 3. The closure 1 is then removed from the container 2 and the second tamper evident band 13 pulls free from the overcap 3 and rests on the land portion 25 of the container. The removal of the second tamper evident band 13 indicates that the container 2 has been opened and the sample has either been contaminated or tested.

The overcap and inner cap are preferably made separately and later assembled form the closure. Preferably, the overcap and inner cap are made of plastic as this allows the overcap and inner cap to be easily moulded. In addition, separate production of the overcap and the inner cap allows for different coloured plastics to be used for the overcap and inner cap, thereby assisting indication that the container 2 has a sample.

- 13 -

The word "comprises", "comprising" and any variants thereof are intended to be used in its inclusive sense and in no way is intended to limit the features of
5 the invention.

It is understood that various modifications, alterations, variations and additions to the construction and arrangement of the embodiment described herein are
10 considered as falling within the ambit and scope of the present invention.

- 14 -

CLAIMS:

1. A tamper evident closure for a container comprising:

5

an inner cap having a first tamper evident band joined to the inner cap by a frangible portion for tamper evidencing engagement with the container;

10

an overcap having a second tamper evident band joined to the overcap by a frangible portion for tamper evidencing engagement with the container;

15

the overcap being engageable with the inner cap, and selectively movable from a first position in which the second tamper evident band is not engaged with the container to a second position in which the second tamper evident band engages the container.

20

2. The closure defined in claim 1 wherein the second tamper evident band engages the container via the first tamper evident band.

25

3. The closure defined in claim 2 wherein the second tamper evident band engages the first tamper evident band while the first tamper evident band engages the container.

30

4. The closure defined in any one of the preceding claims further includes a frangible member between the inner cap and the overcap for controlling movement of the overcap from the first position to the second position.

35

5. The closure defined in claim 4 wherein the frangible member provides a visual indication of the movement of the overcap to the second position and thus engagement of the second tamper evident band with the container.

- 15 -

6. The closure defined in claim 4 or claim 5 wherein
the frangible member is part of the overcap.
- 5 7. The closure defined in claim 6 wherein the
frangible member is a removable portion that is joined to
the overcap by a frangible portion.
- 10 8. The closure defined in claim 7 wherein the inner
cap includes a raised top portion for separating the
removable portion from the overcap.
- 15 9. The closure defined in claim 8 wherein the raised
top portion has a step portion for restraining movement of
the overcap relative to the inner cap so that the overcap
and the inner cap move as a unit when the raised top
portion has separated the removable portion from the
overcap.
- 20 10. The closure defined in claim 9 wherein the
diameter of the step portion is larger than the diameter
of an aperture formed by separation of the removable
portion from the overcap whereby the step portion allows
the overcap to be positively retained by the raised top
portion when the raised top portion has separated the
removable portion from the overcap.
- 30 11. The closure defined in any one of the preceding
claims whereby the frangible portions joining the inner
cap and the overcap with their respective tamper evident
bands have differing strengths.
- 35 12. The closure defined in claim 11 wherein the
frangible portion joining the overcap and the second
tamper evident band is stronger than the frangible portion
joining the inner cap and the first tamper evident band
thereby ensuring that when excessive force is applied to

- 16 -

the closure the first tamper evident band breaks from the inner cap before the second tamper evident band breaks from the overcap.

- 5 13. The closure defined in any one of the preceding claims wherein the first tamper evident band has a lug portion for engaging the second tamper evident band.
- 10 14. The closure defined in claim 14 wherein the first tamper evident band has an outwardly extending lug portion.
- 15 15. The closure defined in claim 15 wherein the outwardly extending lug portion has a ramp surface for engaging the second tamper evident band.
- 20 16. The closure defined in claim 14 or claim 15 wherein the outwardly extending lug portion is annular.
- 25 17. The closure defined in any one of the preceding claims wherein the first tamper evident band has a lug portion for engaging the container.
- 30 18. The closure defined in claim 17 wherein the first tamper evident band has an inwardly extending lug portion.
- 35 19. The closure defined in claim 18 wherein the inwardly extending lug portion has a ramp surface.
20. 20. The closure defined in claim 18 or claim 19 wherein the inwardly extending lug portion is annular.
21. 21. The closure defined in any one of the preceding claims wherein the second tamper evident band has a lug portion for engaging the first tamper evident band.
22. 22. The closure defined in claim 21 wherein the

- 17 -

second tamper evident band has an inwardly extending lug portion.

23. The closure defined in claim 22 wherein the
5 inwardly extending lug portion has a ramp surface for
engaging the first tamper evident band.

24. The closure defined in claim 22 or claim 23
wherein the inwardly extending long portion is annular.

10 25. The closure defined in any one of the preceding
claims wherein the overcap has an engaging portion for
engaging the inner cap.

15 26. The closure defined in claim 25 wherein the
overcap has an inward land portion.

27. The closure defined in claim 26 wherein the
inward land portion is annular.

20 28. The closure defined in any one of claims 25 to
27 wherein the inner cap has an engaging portion for
engaging the overcap.

25 29. The closure defined in claim 28 wherein the
engaging portion of the inner cap is an outwardly
extending clip portion located near a top edge of the
inner cap.

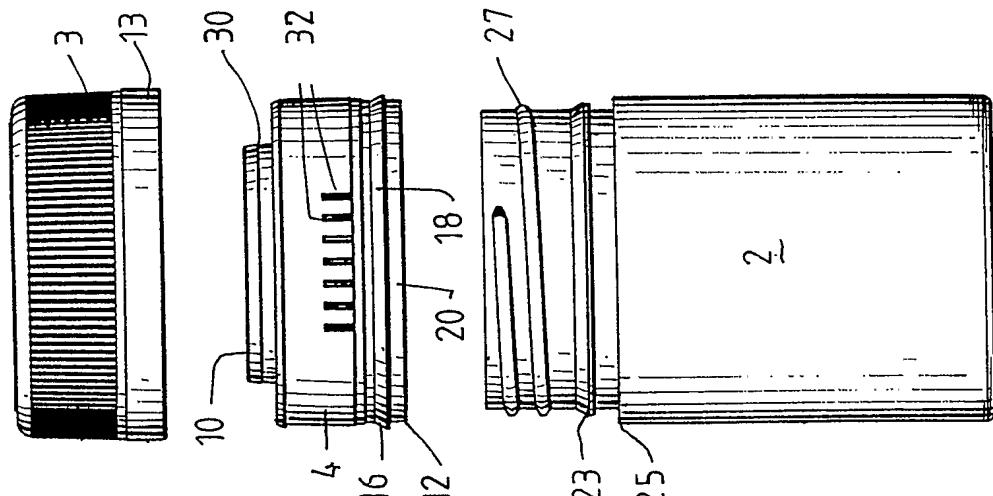
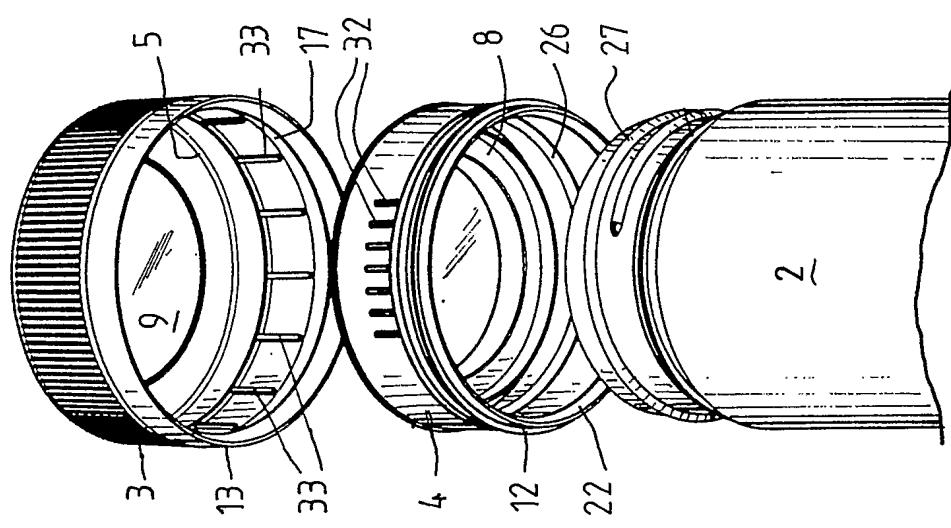
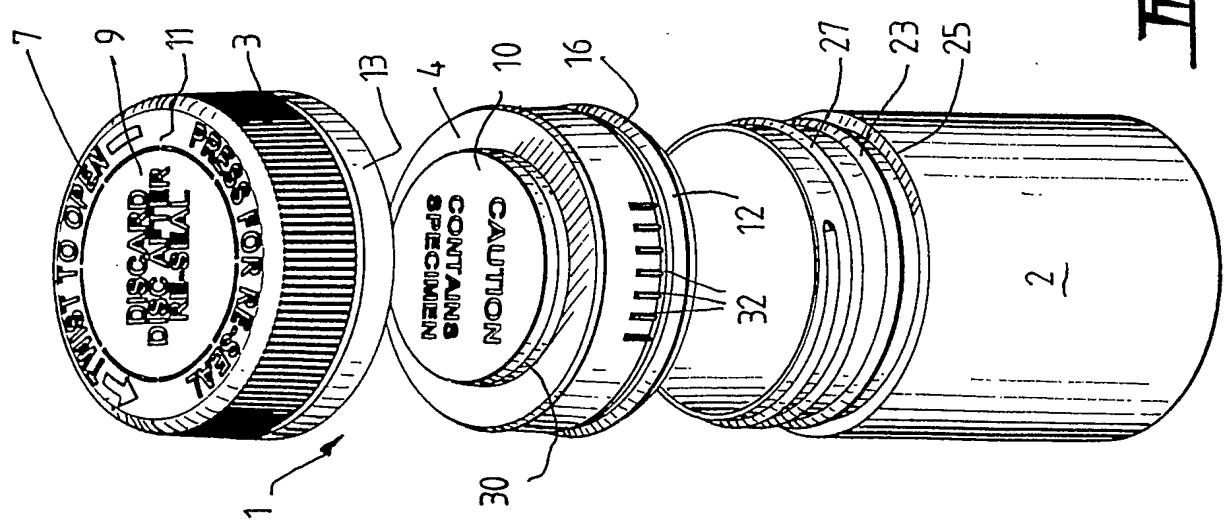
30 30. The closure defined in claim 29 wherein the
outwardly extending clip portion is annular.

35 31. The closure defined in claim 29 or claim 30
wherein the inward land portion of the overcap about
against the outwardly extending clip portion of the inner
cap when the closure is removed from the container and
thereby moves the inner cap upwardly with the overcap.

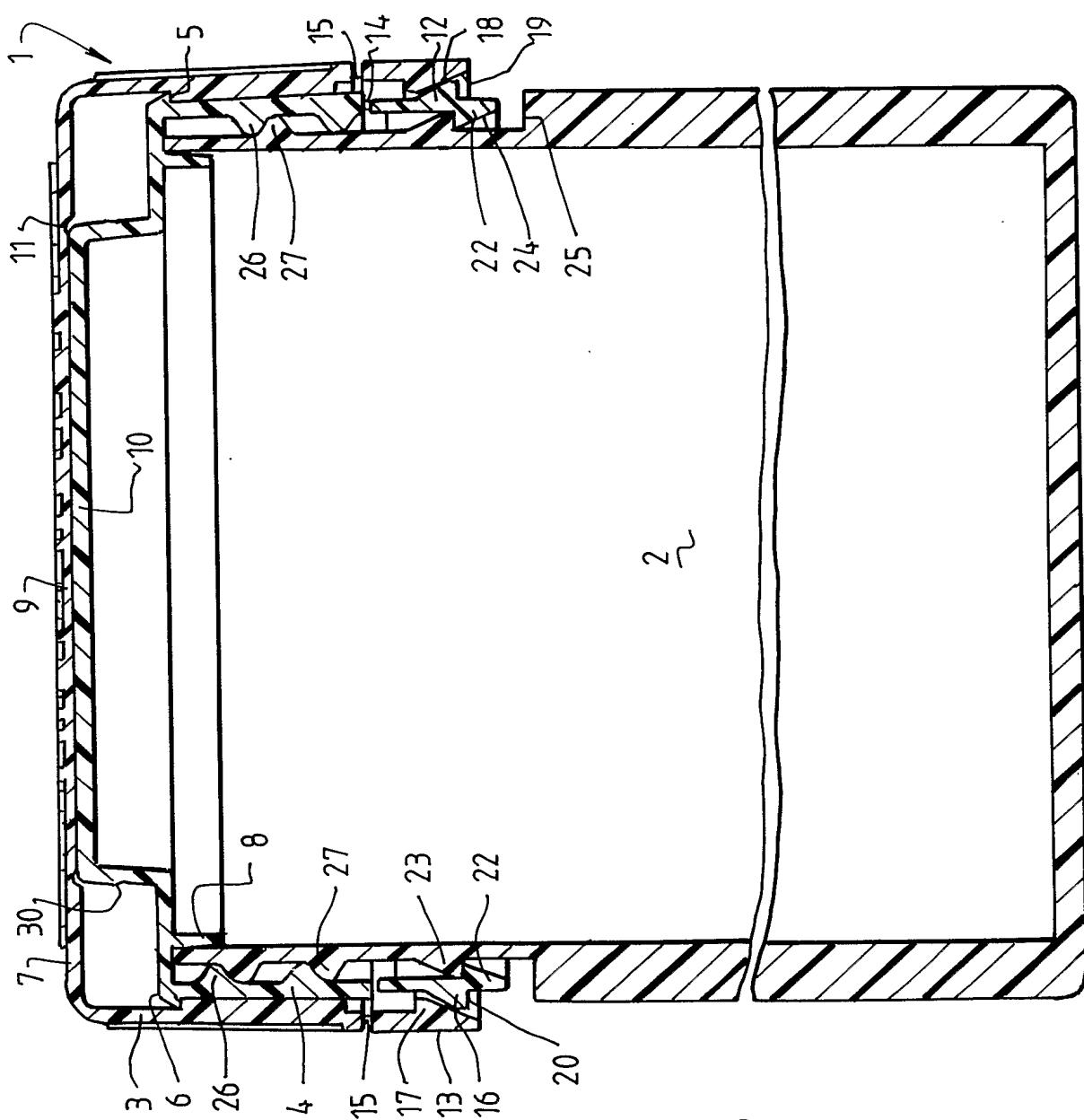
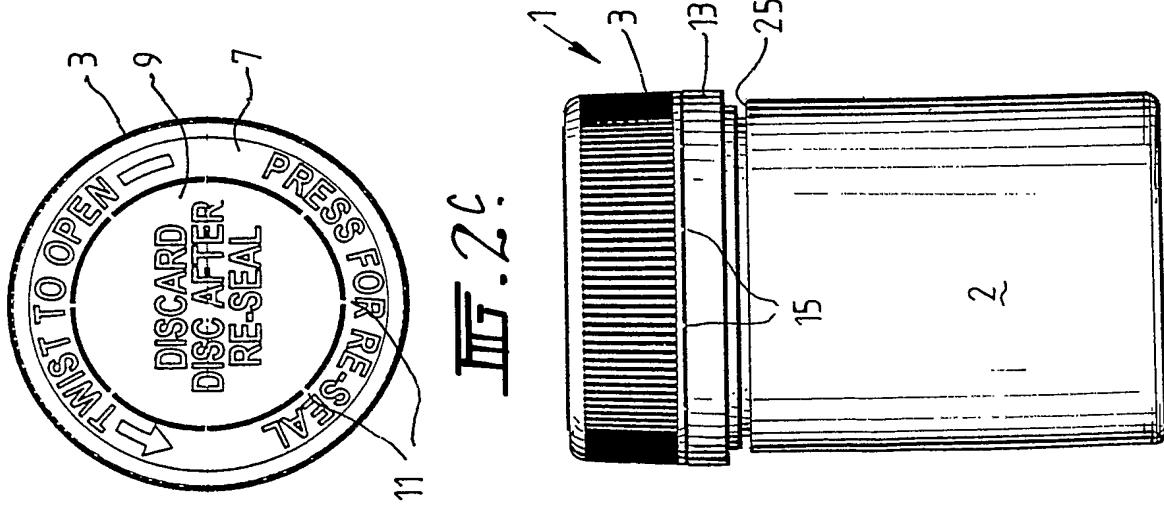
- 18 -

32. The closure defined in any one of the preceding claims wherein the inner cap has a series of vertical ribs for engaging the overcap and the overcap has a series of 5 vertical ribs for engaging the inner cap so that the overcap and the inner cap rotate together to remove the closure from the container.

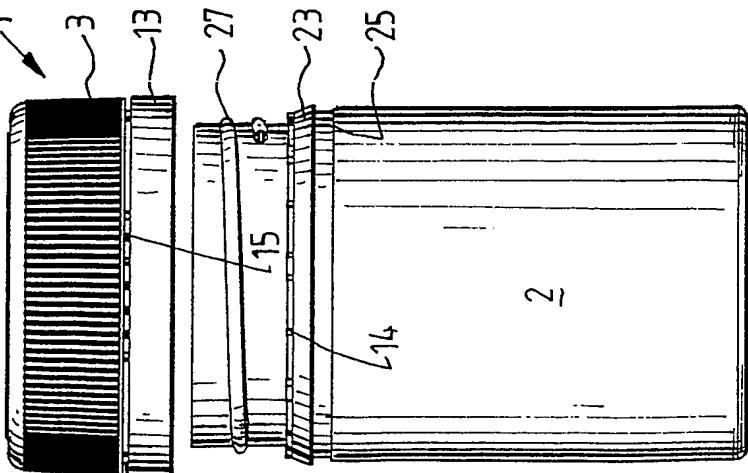
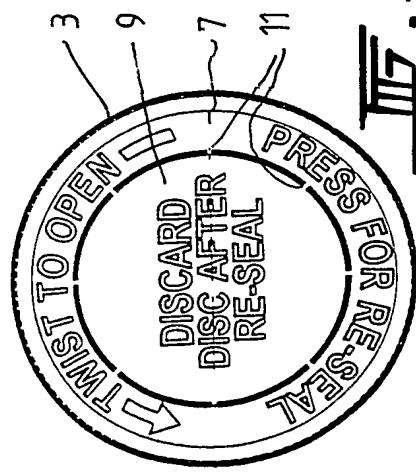
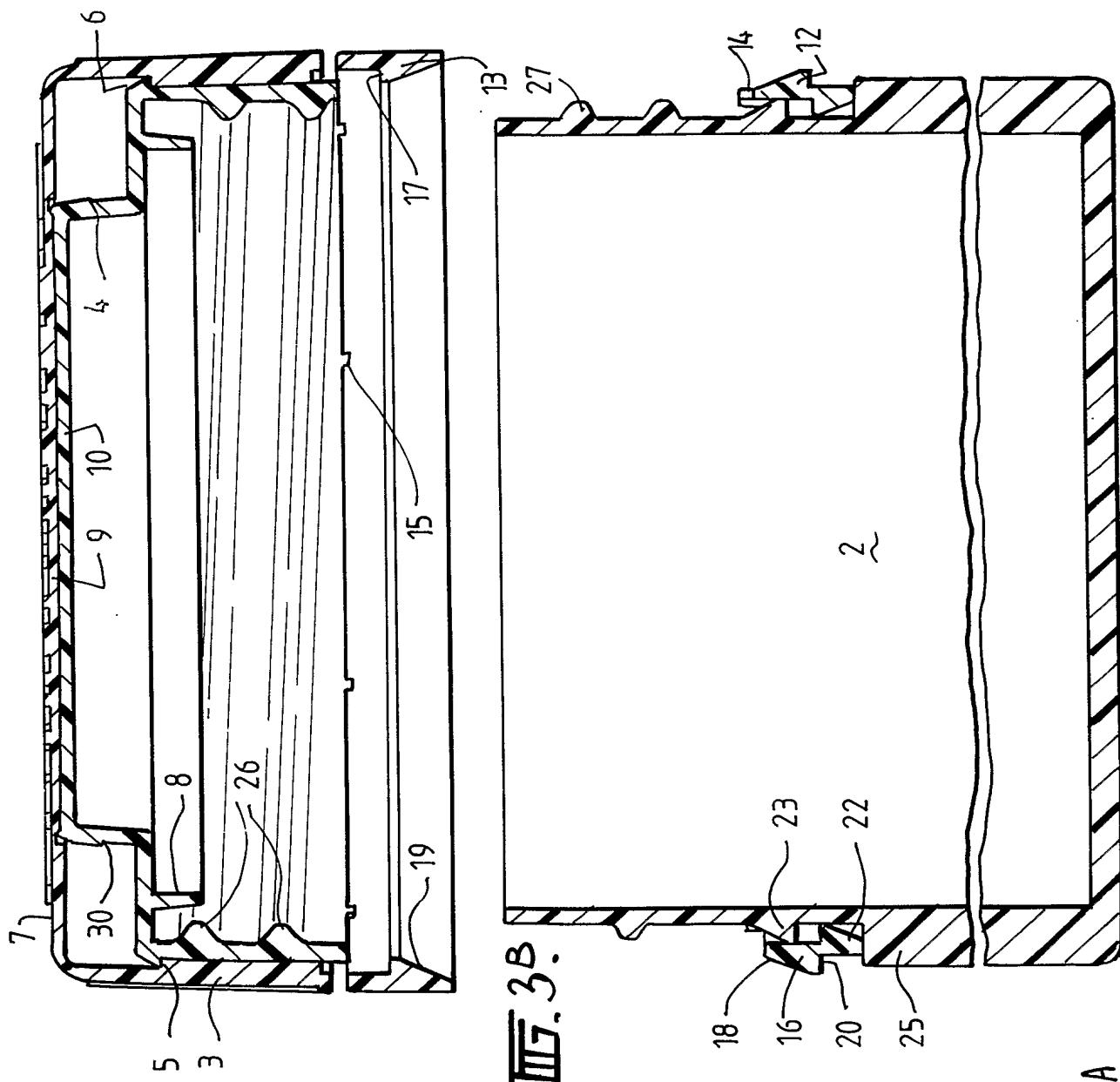
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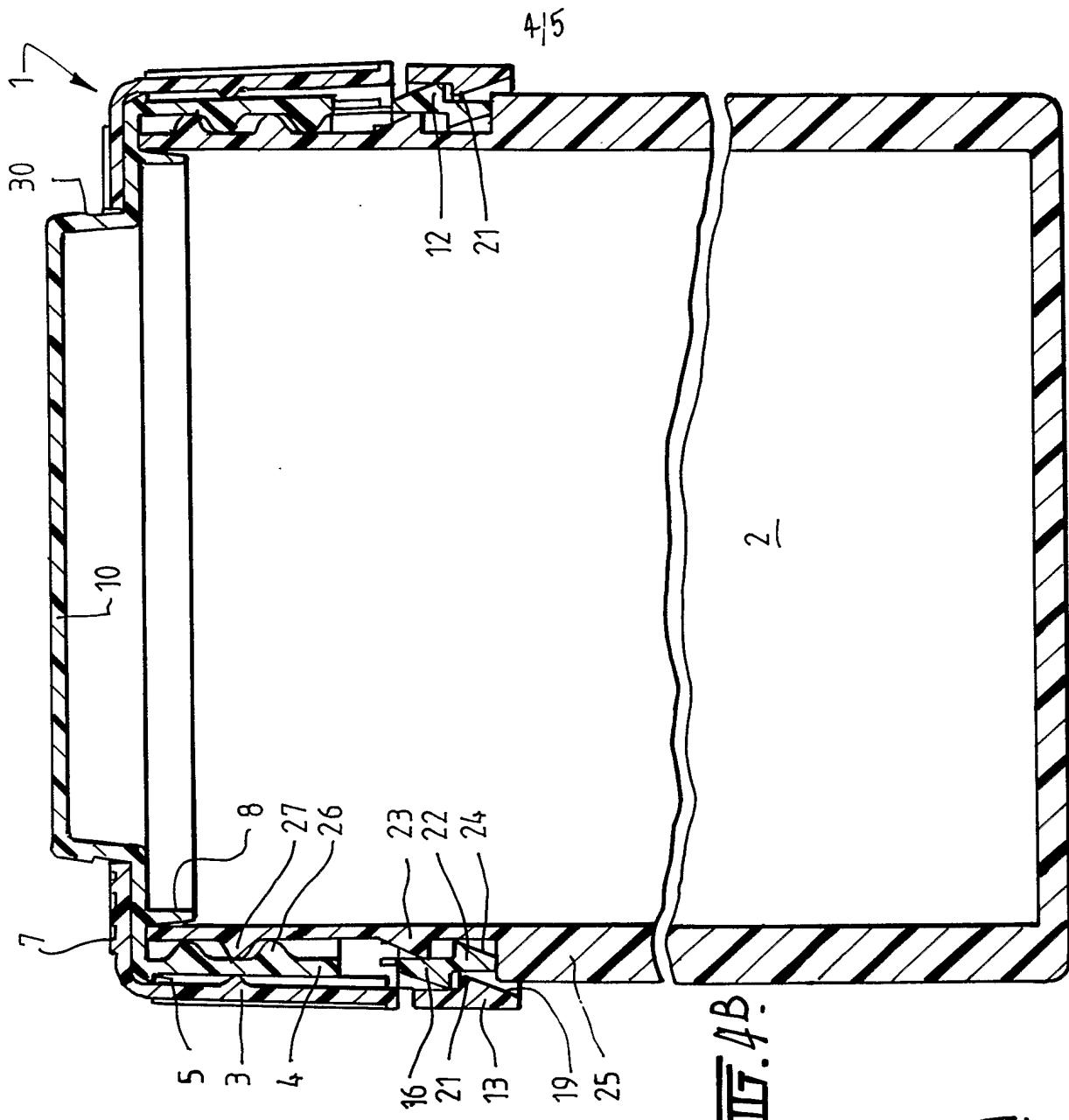
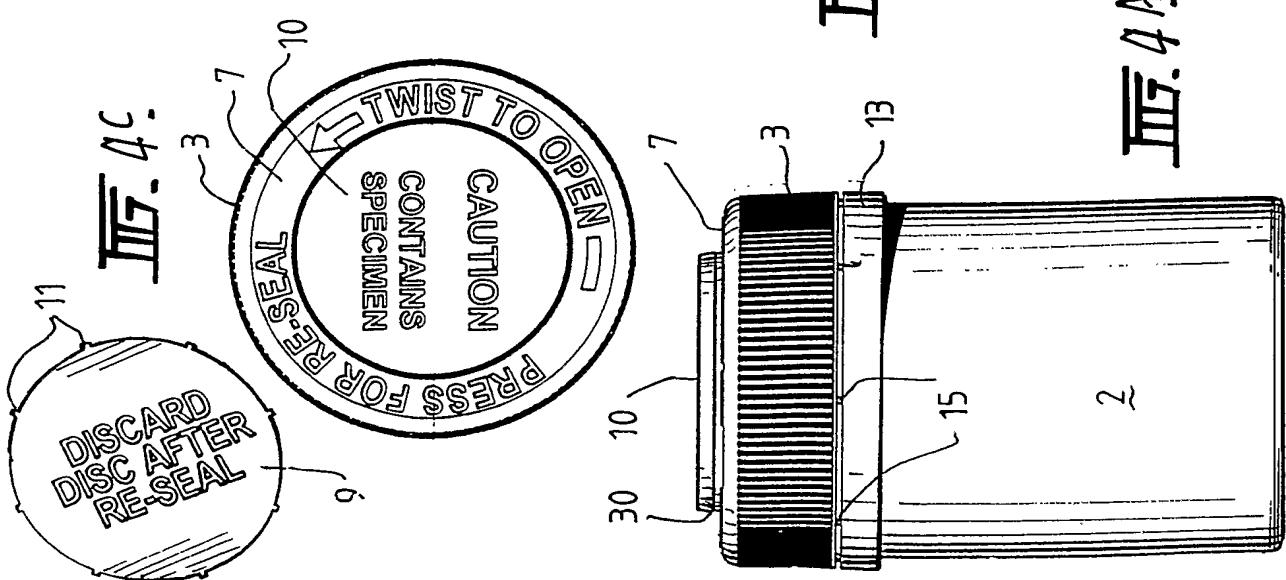
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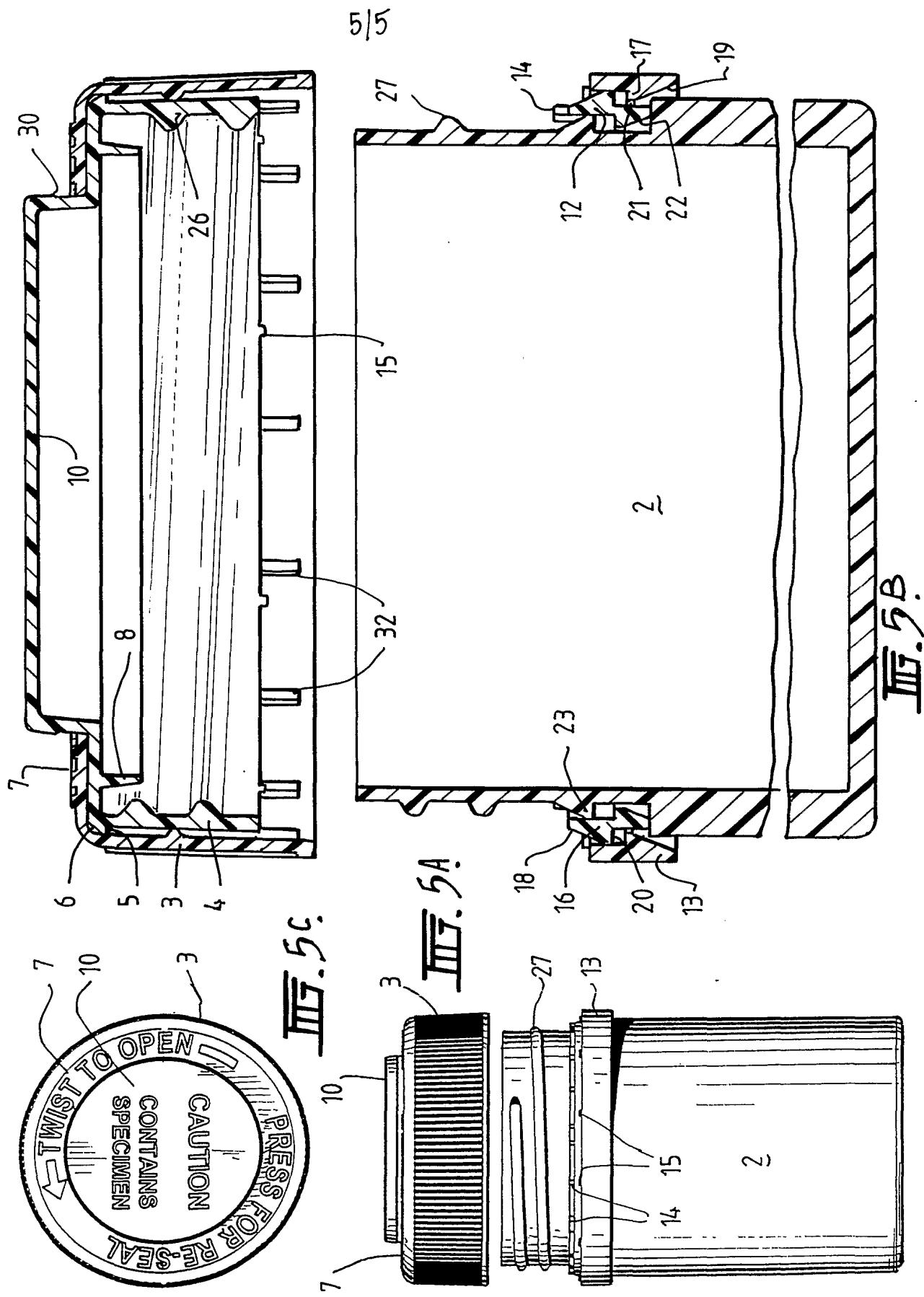
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III.2BIII.2A

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III.3A.III.3B.III.3C.

**III. 4B.****III. 4A.**



INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU02/00105

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. ⁷: B65D 55/02, 41/32, 50/00, 101:00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Refer to Electronic database consulted below

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

DWPI : IPC B65D 41/-, 47/-, 50/-, 51/-, 55/-, 101/00 and keywords (tamper, pilfer, unauthorised, frangible, fracture, tear, overcap, outer cap, band, ring, skirt, indicate, evident, screw, rotate, turn) and like terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	Patent Abstracts of Japan, JP 2000-103454 A (DAIWA CAN CO LTD) 11 April 2000 abstract	1-32
X	US 4181232 A (BELLAMY ET AL) 1 January 1980 Column 3, lines 49-61, in particular	1-32
X	US 5456374 A (BECK) 10 October 1995 Column 7, lines 54-62, in particular	1-32

Further documents are listed in the continuation of Box C See patent family annex

* Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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Date of the actual completion of the international search 21 March 2002	Date of mailing of the international search report - 8 APR 2002
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized officer A. ALI Telephone No : (02) 6283 2607

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU02/00105

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 2141697 A (ROBINSON-WHITE PLASTICS LIMITED (UK)) 3 January 1985 abstract	
X	US 6029834 A (SANNER) 29 February 2000 Column 3, line 36-column 4, line 26	1-32
X	US 6024256 A (BECK ET AL) 15 February 2000 Column 3, line 40-column 3, line 26	1-32

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/AU02/00105

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report	Patent Family Member			
JP 2000-103454	NONE			
US 4181232	BE 864860	CA 1107241	DE 2811092	DK 1120/78
	GB 1580305	NO 780899	SE 7802843	US 4111325
US 5456374	AU 31738/95	CA 2153565		
GB 2141697	NONE			
US 6029834	DE 29807243			
US 6024256	AU 42655/97	BR 9711864	CN 1230933	EP 929462
	IL 128530	NZ 335020	PL 332637	US 5829611
	WO 98/15466	BR 9907676	EP 1086041	PL 340877
	WO 99/42401			

END OF ANNEX

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INT-CL (IPC): B65D055/02 , B65D041/32 , B65D050/00

EUR-CL (EPC): B65D041/34 , B65D051/18